

# Air Ionizer Test Kit Installation, Operation and Maintenance



Made in the  
United States of America



Figure 1. SCS 770718 Air Ionizer Test Kit

## Description

The SCS 770718 Air Ionizer Test Kit allows the 718 Static Sensor to be used to measure the offset voltage (balance) and charge decay of ionization equipment. The Air Ionizer Test Kit also includes a charger used to place a  $\pm 1000V$  charge on the conductive plate, making it possible to also measure the discharge times of air ionization equipment per ANSI/ESD SP3.3 Periodic Verification of Air Ionizers. The 770718 Air Ionizer Test Kit includes the 718 Static Sensor, providing a highly portable and cost effective means of verifying the performance of a wide variety of ionization equipment.

**Note:** The Static Sensor is designed to operate only with the 770718 Air Ionizer Test Kit. It is not compatible with other brands.

Although not as accurate, the SCS Air Ionizer Test Kit has been designed to make measurements that correspond to those made by using a charged plate analyzer and ANSI/ESD STM3.1. The Air Ionizer Test Kit provides convenience and portability to test per ANSI/ESD SP3.3 Periodic Verification of Air Ionizers or Compliance Verification ESD TR53. We recommend the SCS 770004 or 770005 Charged Plate Analyzer if precise measurements are required.

“All nonessential insulators such as coffee cups, food wrappers and personal items shall be removed from the EPA.

The ESD program shall include a plan for handling process-required insulators in order to mitigate field-induced CDM damage.

If the field measured on the process required insulator is greater than 2000 volts/inch and the process required insulator is less than 30 cm (12 inches) from the ESDS item, steps shall be taken to either:

- A) Separate the required insulator from the ESDS item by a distance of greater than 30 cm (12 inches); or
- B) Use ionization or other charge mitigating techniques to neutralize the charge.

If the field measured on the process required insulator is greater than 125 volts/inch and the process required insulator is less than 2.5 cm (1 inch) from the ESDS item, steps shall be taken to either:

- A) Separate the required insulator from the ESDS item by a distance of greater than 2.5 cm (1 inch); or
- B) Use ionization or other charge mitigating techniques to neutralize the charge.

**NOTE:** The accurate measurement of electrostatic fields requires that the person making the measurement is familiar with the operation of the measuring equipment. Most hand held meters require that the reading be taken at a fixed distance from the object. They also normally specify that the object has a minimum dimension of fixed size in order to obtain an accurate reading.” (ANSI/ESD S20.20 section 8.3.1 Insulators)

The Static Sensor, Air Ionizer Test Kit, and its accessories are available as the following item numbers:

Item	Description
<a href="#">718</a>	Static Sensor
<a href="#">770718</a>	Air Ionizer Test Kit
<a href="#">770719</a>	Conductive Plate and Charger
<a href="#">770009</a>	Air Ionizer Test Kit Carrying Case

## Packaging

### 770718 Air Ionizer Test Kit

- 1 Static Sensor
- 1 Conductive Plate
- 1 Charger
- 2 9V Alkaline Batteries
- 1 Carrying Case
- 1 Certificate of Calibration

### 770719 Conductive Plate and Charger

- 1 Conductive Plate
- 1 Charger
- 1 9V Alkaline Batteries
- 1 Carrying Case

## Features and Components

### Static Sensor

See user guide [TB-9016](#) for information on the Static Sensor that is included in the Air Ionizer Test Kit.

### Charger

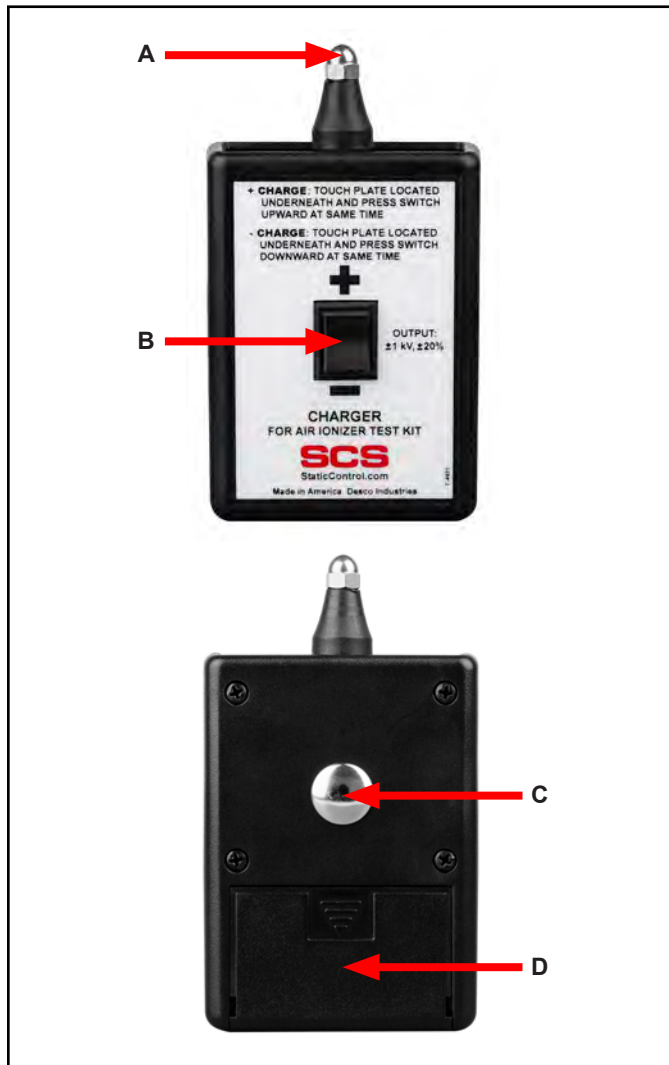


Figure 2. Charger features and components

**A. Output Contact:** The output contact is connected to an internal power source. When the touch plate located underneath the unit is connected to ground, the output contact will provide a charge of the indicated polarity. The charger is designed so that an operator can press the rocker switch and touch the plate simultaneously with the fingers of the same hand.

**B. Rocker Switch:** Press and hold to select the polarity that will be provided at the Output Contact.

**C. Touch Plate:** Make contact with the touch plate while pressing down the rocker switch to provide voltage to the Output Contact. The operator must be properly grounded during use.

**D. Battery Compartment:** Slide the cover down to open the 9V battery compartment.

## Operation

### Performing Offset Voltage (Balance) Measurements

The Air Ionizer Test Kit has been designed to match the compact size and hand held convenience of the Static Sensor. Use the following procedure to verify the offset voltage (balance) of air ionization equipment. This quick and easy procedure will help determine if the piece of ionization equipment is working within the manufacturer's specifications or user requirements. It is extremely important that ionizers be checked regularly for offset voltage (balance) and discharge times. An ionizer operating in an out-of-balance state can place a charge on sensitive electronic components or assemblies.

**NOTE:** The Static Sensor is built in a conductive case. The instrument senses the difference in potential between the case (and the person holding the case / ground connection) and the surface under test. Ensure that the person using the instrument is wearing a wrist strap and grounded to achieve more accurate measurements.

### Installing the Conductive Plate

The Static Sensor's case has two slots along its sides. The top slot is closest to the face of the instrument. Slide down the tabs of the Conductive Plate plate into the top slot of the Static Sensor's case as far as they go.



Figure 3. Sliding the Conductive Plate onto the Static Sensor

### Zeroing the Static Sensor

Turn the Static Sensor on by pressing the POWER button. Press the RANGE / ZERO button to set the Static Sensor to the 2 kV (3 decimal places) range. Make contact between the top of the Conductive Plate and a grounded surface. Press and hold the RANGE / ZERO button until the Static Sensor displays “.000”.

### Performing a Measurement

Locate the Test Kit in an ionized environment at the appropriate distance from the device under test. The static field displayed is the actual balance of the ionizer or voltage offset. The display will indicate “1” or “-1” when the Static Sensor is over-ranged. Change the range of the unit if necessary.

NOTE: When testing pulsed ionizer systems, the voltage displayed is constantly changing. This pulse rate may be faster than the display update rate of the Static Sensor, therefore the displayed voltage is an average of the actual voltage. The output of the Static Sensor is useful in this situation for more accurate measurements.

### Holding the Last Reading

With the Static Sensor positioned 1 inch from the object being measured, press the HOLD button. This will freeze the reading from the object on the display and the analog output signal. This feature allows the operator to move the Static Sensor where it may be more easily read or saved for later reference.

**Note:** The red ranging lights will be off while the Static Sensor is in HOLD mode. It is advised to do this between measurements to prolong battery life.



Figure 4. Reading the Static Sensor while in the  $\pm 20$  kV range

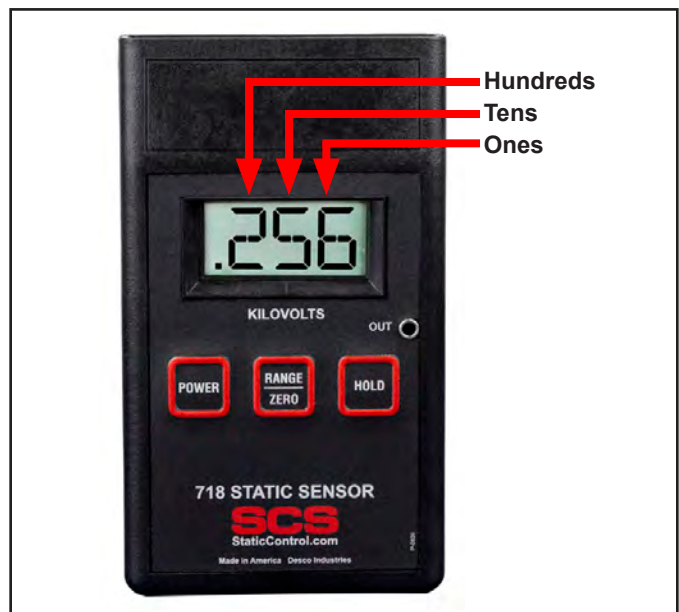


Figure 5. Reading the Static Sensor while in the  $\pm 2$  kV range

### Analog Output

The analog output jack labeled “OUT” on the face of the Static Sensor accepts a standard 2.5 mm monaural phone plug and is provided so the output of the Static Sensor may be connected to an oscilloscope, strip chart recorder, external Static Sensor or other device. The voltage at this output is 1/1000th ( $\pm 2$  kV range) or 1/10,000 ( $\pm 20$  kV range) of the measured voltage. Contact Customer Service for more information.

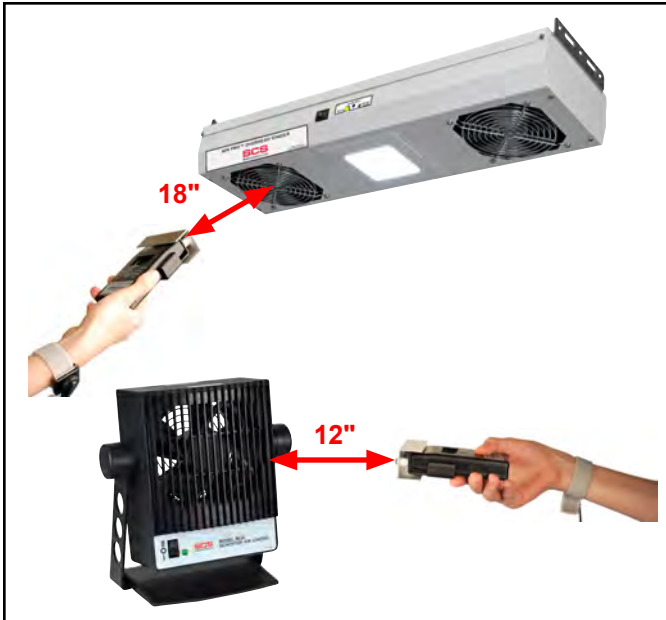


Figure 6. Auditing ionization equipment with the Static Sensor and Conductive Plate (Ref: ANSI/ ESD SP3.3)

### Performing Discharge Time Measurements

In order to verify that an ionizer is operating properly it is also important that its ability to neutralize or discharge static electricity is measured. The following procedure will measure an ionizer's discharge time:

#### Operating the Charger

The Charger has a momentary rocker-switch that powers the unit. Holding the switch forward / backward supplies power to the output terminals.

#### Polarity Selection

The top of the rocker switch is labeled "+", and the bottom is labeled "-". To provide a POSITIVE voltage output, touch the plate located underneath the charger, and press the switch forward at the same time. To provide a NEGATIVE voltage output, touch the plate located underneath the charger, and press the switch downward at the same time.

NOTE: For the Charger to work correctly, the operator and Static Sensor must be properly grounded. A ground path to the touch plate must exist.

### Ionizer Discharge Time

Use the Static Sensor with the conductive plate in the appropriate location for measurements.

### Positive Discharge Time Measurements

To provide a POSITIVE voltage output, touch the plate located underneath the Charger, and press the switch forward at the same time. Momentarily touch the Charger's output terminal to the conductive plate attached to the Static Sensor. The Static Sensor reads approximately +1.10 kV. By using a stop watch or other timing device, determine the time needed for the voltages to decrease from +1.10 kV to +0.10 kV. This is the positive discharge time.

### Negative Discharge Time Measurements

To provide a NEGATIVE voltage output, touch the plate located underneath the Charger, and press the switch downward at the same time. Momentarily touch the Charger's output terminal to the conductive plate attached to the Static Sensor. The Static Sensor reads approximately -1.10 kV. By using a stop watch or other timing device, determine the time needed for the voltages to decrease from -1.10 kV to -0.10 kV. This is the negative discharge time.



Figure 7. Charging the Conductive Plate on the Static Sensor

NOTE: A ground path must be provided between the touch plate of the Charger and the ground reference of the Static Sensor. This is normally provided by holding the Charger in one hand and the Static Sensor with Conductive Plate in the other.

## Maintenance

The Static Sensor is factory calibrated and no maintenance is required. If for any reason you believe the Static Sensor is not working correctly, please contact [SCS Customer Service](#). CAUTION - There are no user serviceable parts. Any unauthorized service will void the warranty and result in additional repair charges.

NOTE: This Static Sensor is a precision instrument and should not be subjected to dropping as that would void the warranty.

### Replacing the Battery

The Static Sensor operates from a standard 9 VDC alkaline battery. Battery life is in excess of 50 hours under normal use. When the battery voltage drops below 6.5 V, "BAT" will appear on the display. To change the battery, slide the battery cover down at the back of the Static Sensor and remove the battery from the battery clip. Replace the battery with a fresh one and reinstall the battery cover. The battery should be removed from the Static Sensor if it is to be stored for an extended period of time.

The battery in the Charger should be replaced annually or when it is unable to provide approximately  $\pm 1100V$ .

### Cleaning

It is important to keep the insulators on the adapter plate clean and free of contaminants that may cause surface leakage. To test the performance of the adapter plate, charge the plate and note the discharge rate in a nonionized area. The self discharge rate to 10% of original voltage should not be less than five minutes.

The area around the aperture of the Static Sensor must be kept clean to ensure accurate, drift-free readings. Never touch the aperture with anything. To remove dust or other particulate matter, use low-pressure instrument-grade air. To remove more severe contamination, spray or flush with the smallest practical amount of clean technical-grade of isopropyl alcohol. Then allow the instrument to air dry for several hours.

## Calibration

Frequency of recalibration should be based on the critical nature of those ESD sensitive items handled and the risk of failure for the ESD protective equipment and materials. In general, SCS recommends that calibration be performed annually.

### Equipment Needed

- 1 High Voltage Power Supply (10,000 V)
- 1 Voltmeter (with > 50 kilohms input impedance)
- 1 Cable with a 2.5 mm mono plug and secondary connector to interface with voltmeter.

### Test Fixture

- 1 Metal Plate with 5 in<sup>2</sup> area or greater
- 1 Metal Stand for supporting the Static Sensor and holding its top face 1 inch away from the metal plate
- 2 Connectors on the metal plate with which it can interface with the high voltage power supply
- 1 Connector on the metal stand with which it can be connected to electrical ground

### Procedure

1. Place the Static Sensor on the metal stand, and verify that its top face is placed exactly one inch away from the center of the metal plate.
2. Connect the stand to equipment ground.
3. Power the Static Sensor and set it to the low range.
4. Ground the metal plate, and zero the Static Sensor's display.
5. Disconnect the metal plate from equipment ground, and connect it to the high voltage power supply.
6. Apply a +1,000 V charge to the plate.
7. The Static Sensor should now display 1.000.
8. If the Static Sensor does not display 1.000, remove the battery door and use a screwdriver to turn the small trimpot located inside the battery compartment. Turn the trimpot until the display reads 1.000. This will calibrate the low range of the Static Sensor.
9. Repeat steps 6-8 for the high range on the Static Sensor and use a test voltage of 5,000 V.

## Specifications

### Static Sensor

#### Performance

Measurement Range (switch selectable)

*Low Range* 0 to  $\pm 2$  kV / inch

*High Range* 0 to  $\pm 20$  kV / inch

Measurement Accuracy

*Voltage Monitor Output* Better than  $\pm 5\%$  of reading, 10mV

*Voltage Display* Better than  $\pm 5\%$  of reading,  $\pm 2$  counts

Measurement Stability  $\pm 10$  counts

#### Voltage Monitor

Output 2 volts output at full scale

Ratio

*Low Range* 1/1000 of the measured electrostatic field

*High Range* 1/10000 of the measured electrostatic field

#### Front Panel Meter

Voltage Display 3-1/2 digit LED display

Range

*Low* 0 to  $\pm 1.999$  kV / inch

*High* 0 to  $\pm 19.99$  kV / inch

Display Resolution

*Low Range* 1 V / inch

*High Range* 10 V / inch

Sampling Rate 3 readings per second

#### Features

Automatic Shutoff Unit will shut off after 20 minutes from last activity

Ranging System LED distance indicator; aligned targets indicate one (1) inch

Range / Zero Switch LED distance indicator. Resets the instrument to zero and selects the measurement range.

Low Battery Indicator An LCD display message indicates when the battery is low

Hold Switch Retains the LCD display reading when depressed

### General

Dimensions 0.9" H x 2.8" W x 4.9" L  
(24 mm x 70 mm x 126 mm)

Weight 4.9 oz. (140 g) with battery

Voltage Monitor Connection 2.5 mm jack (3/32")  
monophone

*Tip* Signal

*Sleeve* Ground

Operating Conditions

*Temperature* 50 to 86°F (10 to 30°C)

*Relative Humidity* To 80%, non-condensing

*Altitude* To 2000 m

Certifications UL, CE

### Power Requirements

Power One (1) 9-volt alkaline battery

Operating Time Greater than 50 hours,  
with a new battery at 21°C  
continuous

Power Switch A membrane switch that  
is designed to prevent  
accidental turn on. Powers  
the instrument on and off.

### Air Ionizer Test Kit

Conductive plate Assembly Aluminum bracket, bare  
aluminum plate and teflon  
spacers isolate plate from  
bracket

Voltage Output 1/1,000 of measured voltage  
@ low range  
1/10,000 of measured  
voltage @ high range

Conductive plate Area 2.95" W x 1.18" L  
(7.5 x 3.0 cm)

Conductive plate Assembly Weight 2.4 oz. (68 g)

Charger Dimensions 1.1" H x 2.6" W x 4.5" L  
(2.8 x 6.6 x 11.4 cm)

Charger Weight 5 oz. (140 g) with battery

Charger Power Requirements One 9-volt alkaline battery

Charger Output (using Static Sensor with  
conductive plate) 1.1 kV minimum for  $\pm$  voltage

Certifications CE

Limited Warranty, Warranty Exclusions, Limit of  
Liability and RMA Request Instructions